Bill Blackwood
Law Enforcement Management Institute of Texas

Police Fleet Vehicle Equipment and Officer Safety Awareness

An Administrative Research Paper
Submitted in Partial Fulfillment
Required for Graduation from the
Leadership Command College

By
Ricardo Cardenas Sr.

Comal County Sheriff's Office
New Braunfels, Texas
September 2010

ABSTRACT

The purpose of this research is to support information on the ergonomics and installation options available to the law enforcement community. Law enforcement agencies will gain a better understanding of the scientific concerns when designing police fleet vehicles according to the needs of law enforcement officers who rely on these mobile offices on a daily basis for eight to ten hours or more per shift. Officer safety awareness or ergonomics in police vehicles and after-market installed equipment, is relevant to contemporary law enforcement because most law enforcement agencies are aware of equipment safety problems and are failing to properly address or convey their concerns. Failure to address this issue is often the result of financial and time constraints, as well as additional paperwork by officers, administrators, fleet managers, and vehicle dealers.

The method of inquiry used by the researcher included: magazine articles, journals, published articles from the media, and internet websites. Research materials also included examining the Automaker's Modifier Guide. The Automaker's Modifier Guide contains reference information based on the vehicle test results from both the Michigan State Police and the Los Angeles County Sheriff's Department. Information was also gathered from surveys that were distributed to 30 law enforcement agencies. In addition, interviews were conducted with four licensed installers of police and emergency service equipment.

It was discovered that, at this time, enough attention is not being paid to officer safety with regard to the technology needed in the police fleet vehicle. More attention needs to be focused on how police equipment is mounted and the immediate needs of

each officer within the cockpit area of the vehicle. In addition, officers need awareness education as to hazards of carrying personal items, which have no work-related value, within the interior of the work vehicle.

TABLE OF CONTENTS

INTRODUCTION

The purpose of this research is to gain information and educate those involved with police vehicle equipment and after-market installation options for law enforcement because, often, properly addressing this safety issue is not a main concern in the law enforcement community. The main focus has always been that the officer has to have all the necessary equipment and weapons readily available to perform his/her job. Recently, because more attention has been given to the relevance of officer safety, a shift in focus has been given to installing equipment out of the way of the airbag's path of deployment, but the officer may have difficulty safely using their necessary equipment while operating the vehicle in motion. Another suggested solution is the installation of an off switch that disables the airbag, but it requires an application for permission from the National Highway Safety Administration (Tucker, 2003). An additional concern is that installation of after-market switches may void any warranties or liabilities from the vehicle manufacturer. Law enforcement agencies need to better understand the airbag system operation in today's police fleet vehicles. Smaller law enforcement agencies do not have a budget for testing, much less the money for complicated pieces of police vehicle equipment.

It is anticipated that this research will not only demonstrate cost effectiveness, but it will also illustrate that officer safety should never be compromised. These are two benefits outlined throughout this research. The problem at hand is that department standards need to be set up and mandated to ensure a limited amount of body movement in the cockpit area of today's patrol car.

An officer's nose was broken by a mobile data laptop computer. Another was knocked out of consciousness due to his shotgun striking him in the head. A third officer received an injury to his eye from a wire of his radar unit that was mounted upon the dashboard of his patrol car. The injury resulted in the officer partially losing his vision. The perpetrator in each case was not a demented attacker but the passenger side air bag (Alonzo-Zaldivar, 2002). In a vehicle crash, when an airbag deploys, the force of it can turn mounted equipment into high velocity blunt force objects, according to experts (Alonso-Zaldivar, 2002). A cellular phone, a global positioning system directional tracking device (GPS), and other such technological equipment items in today's police cars are added hazards to all officers. It is "an issue that needs to be brought to the attention of all law enforcement communities" said Rae Tyson, a spokesman for the National Highway Safety Administration. Rae Tyson issued an alert because of this concern the week of August 7, 2002 (Alonso-Zaldivar, 2002, para. 4).

Patrol officers set up their vehicles for convenience, and the need to be able to quickly access law books, file boxes with a variety of forms, ticket book holders, aluminum clipboards, seat organizers, field glasses, portable breath analyzers, and numerous other items, which are usually placed in plastic containers on the passenger seat. This exceeds the weight limit and activates the passenger side airbag system. Bungee cords and Velcro are used on top of dashes to secure equipment. Within a short period of time, the heat and ultra rays of the sun dry rot the elastic in the bungee cords and compromise the glue on the Velcro. By virtue of the elements of the sun, the equipment may break loose, allowing it to fly loosely about the cockpit area, which could cause the driver to be struck and possibly lose attention as he drives. If, at any time,

the airbag does not deploy in a rollover motor vehicle crash, these loose equipment items can, at the very least, cause a great degree of injury to the officer.

This research will be narrowed to the Dodge Chrysler, Ford Motor Company, and General Motors Division. These automakers ergonomically design today's top sedan vehicles, which are highly considered by law enforcement agencies for use. Up-to-date information will provide the general measurements for head room, leg room, shoulder room, hip room, and front and rear volume, including trunk space. The reduced amount of occupied space, after the installation of police equipment, will prove to be a major factor.

To obtain broad information for this subject matter, the methods of inquiry for this basic research will consist of articles from police fleet magazines and related journals and internet or published news articles that give specific support in the area of ergonomics. Research facts from the automakers will be the main source of relevant information. Supportive fleet maintenance surveys from different agencies and reference information from professional police equipment installation companies were sought to give further reference to support this research. Safety, comfort, and convenience are the three factors that should be considered in today's police vehicle.

The medical expenses and the cost of replacing or repairing damaged equipment are important to any department. However, when comparing the cost associated with an officer being injured to the high cost of repairing or replacing damaged equipment, the officer must be considered the higher priority. A consideration to reduce the risk of exposures to injury is relevant. The anticipated outcome of this research will support information that will benefit the officer, who, in their performance, is the one at risk. It is

also anticipated that supportive information in this research will benefit the law enforcement community by decreasing medical and damaged equipment expenses. The taxpayer, who ultimately is left to pay the bill, will also benefit financially when these expenses have lessened.

REVIEW OF LITERATURE

Police fleet vehicle equipment and officer safety awareness, or ergonomics, is organizing devices, tools, or pieces of equipment so the people using the objects required in performing a job skill work together effectively in a safe manner. It can also be considered the physical and psychological relationship between machines and the people who use them (“Ergonomics”, n.d.). Applications may include the modification of switches and gauges for automobile interiors. It can also relate to reorganizing equipment in a manner that is easily accessible.

This type of research is conducted by those who actually work in and experience these situations on a daily basis. Information is derived from studies relating to the design and evaluation of tasks, jobs, products, environments, and systems in order to make them compatible with the needs, abilities, and limitations of people (“Ergonomics”, n.d.). Compared to law enforcement, few professionals use their vehicle as a mobile office more than a law enforcement officer. It is imperative that today’s patrol officer spend his/her days in a vehicle with a well thought-out ergonomic design. Vehicle manufacturers study ergonomics, and they need to design patrol vehicles with the law enforcement officer in mind.

"Since the vehicle is essentially a mobile office, we want officers to be comfortable," said Sergeant Keith Wilson of the Michigan State Police (MSP) and a test

driver for the Michigan State Police Vehicle Tests (Kozlowski, 2008, para.3). As stated in the article by Kozlowski (2008), there are five factors to be considered: comfort in seating, room for equipment, easy access to instrumentation, unrestricted view of instrumentation, and enough room to install all the necessary equipment, such as radars, in-car video cameras, mobile data computers (MDT), rifle/shotgun racks, flashlight chargers, and other items necessary for the job. Michael Blackmer, a special vehicle engineer supervisor for Ford Motor Company, stated, “While different agencies use laptops for different things, there is an ergonomic problem in having a computer at a 45-degree angle to the driver” (Kozlowski, 2008, para. 4). Due to the amount of twisting involved in using a mounted mobile data terminal, the officer’s comfort is a concern for vehicle manufacturers. Because the lower body remains stationary in the forward position as the officers upper torso rotates to the MDT, the lower back ligaments are pressured. According to Dr. Mittelstedt, a Fort Atkinson Wisconsin-based chiropractor with 22 years experience, “The human body is not designed to twist like that” (Kozlowski, 2008, para. 6). This constant wear and tear can cause long-term affects like injuring the ligaments in the lower back, thereby allowing the disk to shift, and increasing irritation of the sciatic nerve (Kozlowski, 2008, para. 6).

Not sitting straight and slouching can also lead to back problems. “Sitting applies two hundred times more pressure on the lower back than standing,” according to Dr. Mittlestedt (Kozlowski, 2008, para. 30). Kozlowski (2008) also stated that “Officers can handle some comfort and twisting problems through proper sitting posture and preventive exercises” (para. 31). Most patrol cars are equipped with lumbar positioning equipment options. Dr. Mittlestedt suggested placing a foam pad between the seat and

lower back to correct the posture. Additionally, aerobic training can help with joint movements as well as a proper diet and fluid intake. The amount of water needed, according to body weight, are suggested for health reasons and for posture related issues. It will take continual participation of the law enforcement community and the auto manufacturer recognizing as well as a willingness to make necessary changes to keep officers safe and comfortable in their mobile offices.

Lieutenant Brian Moran, with the Los Angeles County Sheriff's Department (LASD), a fleet manager and the head of their police vehicle testing, views ergonomics as it relates to comfort regarding how the officer enters or exits the car. His observations also include the comfort of the vehicle and if the officer's job is more safe and effective (Kozlowski, 2008). Considerations also arise over the equipment that an officer wears on his duty belt. If the officer is right handed and wears a right handed holster, this can interfere with the seatbelt. The holster can unsnap or entangle in the seatbelt when exiting the vehicle. Ford addressed concerns made by officers and designed a seat with form fitted padding molded from the lower rear portion of the seat, which provides room for the officer's holster and handheld radio carrier and other equipment worn on the duty belt..

Mounting equipment, center consoles, and other such mounts or brackets are necessary for the mobile radio and mobile data terminals (MDT) that are installed in the passenger floorboard and passenger seat area. The standard MDT design is mounted on the floorboard, and when the laptop computer is opened, it may partially block the radio and certainly limit windshield visibility. The use or accessibility of switch buttons to release the trunk, shotgun/rifle, vehicle climate control, ash trays, and cup holders are

also factors in this limited space. Since the MDT mount for the laptop computers is an aftermarket purchase, departments should consider accessibility to the in-car radio and crucial accessories versus the convenience of the mount. Through the years, the cars used for patrol have become smaller, yet they are required to hold more than ever before. With all this equipment in the cockpit area of these cruisers, it is a wonder there is any room for the officer. Three of the major vehicle manufacturers researched use a police advisory boards for communication between the manufacturers and law enforcement agencies.

The main focus of this research is the placement of mounted equipment and the altering of mounted equipment with careful thought to airbags and airbag deployment. Additional articles have been published which support the focus of this research. The articles' titles indicate the magnitude of this concern. One such article, published in The Los Angeles Times, August 7, 2002, was entitled, "Police Officers Face New Hazard: Assault by Air Bag." "As Laptops go into squad cars, warning flags go up over safety," by Karen Spencer, a staff writer for The World Herald, was another. Julia Ferrante, of The Tampa Tribune, wrote an article in the December 2, 2002 issue entitled, "Laptops in Police Cars Speer Warning."

Sergeant Keith Wilson, of the Michigan State Police, supported this research even further when he simply stated, "It is possible for something struck by an airbag to become a projectile inside the car when the airbag is deployed" (Kozlowski, 2008, para. 14). Aside from flying MDT laptop computers, printers, and other police equipment, there is also concern for the side-curtain airbag that, for some patrol cars, is optional (Kozlowski, 2008). This may be required to pass the side pole crash test that became

effective for the 2013 model year. These airbags inflate across the side windows to protect passengers in case there is a side-impact crash (Ferrante, 2002). Blackmer (2008) said, “While there is no mandate that says you have to put curtain airbags in the vehicle, passing the crash test will drive vehicle manufactures to integrate them” (as cited in Kozlowski, 2008, para. 16). While there is no issue with side airbags for consumer vehicles, they will cause problems in police squad vehicles. Law enforcement agencies will have to devise a strategy that will consider both the front and rear seat partition in most police vehicles and a safe deployment of the side airbags. If the security partition is removed to allow effective deployment of the side airbags, the officer’s safety is in jeopardy. Based on the November-December 2008 issue of Police Fleet Manager (PFM), roof-rail airbags are being utilized: “Roof-rail airbags are now standard for the Chevy Impala and Tahoe in all versions. Police agencies cannot opt to delete them, so they must make sure that their prisoner partitions and other equipment are compatible with these airbags” (“Michigan State Police 2009 Patrol Vehicle Tests,” 2008, para. 5).

With law enforcement officers sitting for eight to ten hour shifts, the ergonomics of the fleet vehicle is a necessary concern for agencies choosing which vehicle fits their agency. Performance and ergonomic evaluations were conducted by the Michigan State Police and the Los Angeles County Sheriff’s Department (Kozlowski, 2008). They evaluated the Chevrolet Impala and Tahoe (the only pursuit-rated SUV), the Dodge Magnum and Charger, and the popular Ford Crown Victoria Police Interceptor. The categories of evaluation include the front and rear seat, instrumentation, controls, visibility, communications, and a sum total of the average scores using the 10-point

scale. To preclude bias toward any specific vehicle, the scores were averaged. The results are in the Appendix. The Los Angeles Sheriff's Department's tests evaluated each vehicle driven by four drivers on a 100-mile course traveling on different levels of terrain. Visibility and interior room, both important and necessary in law enforcement, were examined. Both extensively evaluated the ergonomics of the vehicles, but neither examined the safe use of aftermarket accessory mounts or equipment (Kozlowski, 2008).

METHODOLOGY

The research question to be examined will consider whether or not an officer or the officer's agency, when discovering a safety or ergonomic design problem in the squad car, should mention it to their agency's administrator or their agency's fleet manager. If so, the administrator or fleet manager must then determine whether to mention it to the dealer from whom the agency has purchased or leased their fleet vehicles. The researcher hypothesizes that although considerations are in place to ensure officer safety in today's police fleet vehicles, officer's lower backs may still be compromised if poor positioning of necessary equipment is continued and not given further study. The method of inquiry includes law enforcement periodicals, Internet sites, and surveying law enforcement officers.

The survey, comprised of 20 questions, covered the ergonomic design with regard to officer safety and comfort within the mobile office and/or vehicle cockpit. The survey was distributed to officers from 30 different agencies, all in attendance at the Law Enforcement Management Institute of Texas in October, 2008. All 30 surveys were returned and completed. The information obtained from the survey will be analyzed and

compiled by this researcher. These findings will then be submitted to the Bill Blackwood Law Enforcement Management Institute of Texas for publication. It will benefit law enforcement with resource information for use with regard to police fleet vehicle equipment and officer safety awareness as addressed herein.

FINDINGS

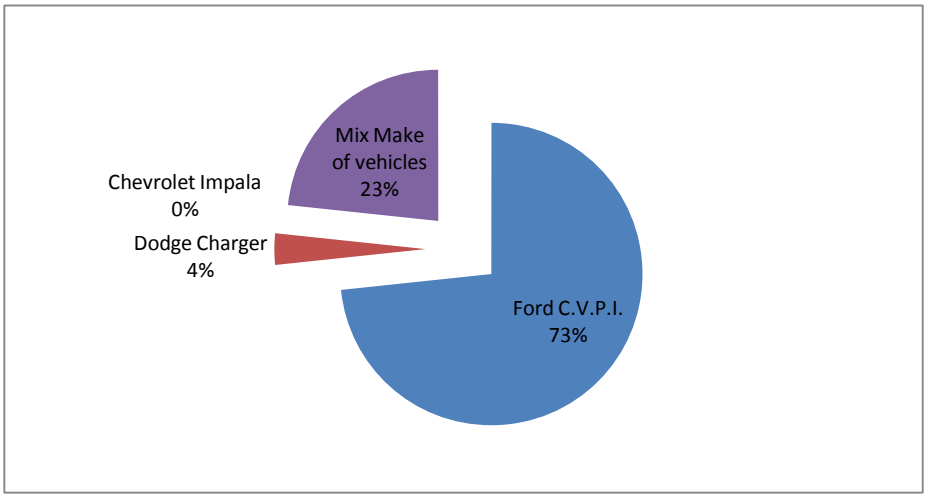


Figure 1. Choice of vehicles for the 30 surveyed law enforcement agencies.

The graph illustrates the make and model of vehicles being used based on a survey of 30 law enforcement agencies. There were 16 agencies surveyed that had less than 25 fleet patrol vehicles. The surveyed participants revealed that 13 law enforcement agencies used Ford Crown Victoria Police Interceptors. Of the other participants, three agencies used more than one make of fleet vehicles, but these are not illustrated in the graph. None of the participants surveyed indicated utilizing the Chevrolet Impala as a fleet vehicle.

Seven participants surveyed had less than 50 fleet vehicles. There were three agencies that used Ford Crown Victoria Police Interceptors. One of the participants indicated that they chose to use the Dodge Charger Police package. Again, no one indicated using the Chevrolet Impala as an agency choice fleet vehicle. Three participants indicated that their agencies used a mixed fleet. The graph does not include information from the participants that used a mixture of vehicles.

Of the participants surveyed, four law enforcement agencies had less than 100 fleet patrol vehicles. There were four agencies whose choice was the Ford Crown Victoria Police Interceptors. Three participants indicated that their law enforcement agencies had more than 100 fleet patrol vehicles, and two of those agencies used the Ford Crown Victoria Police Interceptors. One of the three agencies used a mix of fleet vehicles, none of which are illustrated in the graph.

The survey found that of the 16 agencies with less than 25 fleet patrol vehicles, five leased their vehicles and 11 purchased their vehicles. Eight agencies had assigned take home vehicles, and eight did not have assigned vehicles. Ten of these agencies received their fleet patrol vehicles fully outfitted, and six agencies had to outsource to have all police equipment installed. Of these 16 agencies, 13 used in-car mobile data computers, and three indicated that their agency did not.

The survey also found that of the seven agencies with less than 50 fleet patrol vehicles, all seven purchase their vehicles without police equipment. All seven agencies outsourced to have all police equipment installed. Six of these agencies had a take home policy and assigned their patrol vehicles. One agency did not assign, nor did

they have a take home policy. All seven law enforcement agencies surveyed used in-car mobile data computers.

In addition, of these 30 law enforcement agencies, it was found that of the four agencies with less than one hundred fleet patrol vehicles, two agencies purchased them already equipped with police equipment, and two agencies did not. Two of these law enforcement agencies outsourced an installer to equip their patrol vehicles. Three of these law enforcement agencies assigned their fleet vehicles and had a take home policy, and one of the agencies did not assign. Three of these law enforcement agencies had in-car mobile data computers, and one agency did not.

Finally, of the survey found that of the three agencies with more than 100 vehicles in their fleet, two agencies purchased them already equipped with police equipment, and one agency did not. One law enforcement agency outsourced an installer to equip their patrol vehicles. Two of these law enforcement agencies assigned their fleet vehicles and had a take home policy; one of the agencies did not assign. These surveyed agencies found that all three of these law enforcement agencies used in car mobile data computers.

DISCUSSION/CONCLUSIONS

The problem or issue examined by the researcher considered the necessity for review of equipment carried, mounted equipment proportionate to the operator of today's patrol fleet vehicles in relation to the equipment that an officer wears on his/her duty belt, and the necessary equipment that the officer may feel he/she needs in the cockpit area. What an officer feels they may need may compromise his/her safety in a motor vehicle accident. The purpose of this research was to show probable hazards to

officers by items carried in the police vehicle and a need to review the necessity to answer some questions. Whether or not an officer or the officer's agency, upon discovering a safety or ergonomic design problem in the squad car, should mention it to their agency's administrator or their agency's fleet manager is one question to be answered. If so, deciding whether the administrator or fleet manager should then mention it to the dealer from whom the agency has purchased or leased their fleet vehicles is another question to be addressed.

The research question that was examined focused on dangers related to police vehicle equipment and after market installations. The researcher hypothesized that considerations to ensure overall safety are being studied. However, lower back problems suffered by officers due to inadequate positioning of crucial law enforcement equipment are still an issue.

The researcher concluded from the findings that there is a need to thoroughly examine all available research about installation options to the law enforcement community's vehicles. Special attention must be paid to officer safety, comfort, and convenience. Thorough examination of said research will result in a better understanding of the scientific and health-related concerns when designing today's police cars. It must be emphasized continually that these automobiles, used daily and not merely for transportation but as an all-inclusive office, must be designed to meet every need of the law enforcement officer.

The findings of the research did support the hypothesis that officer safety should not be compromised for any reason. Prevention of short and long term health issues, by initially focusing on officer safety, comfort, and convenience, will exceed initial time

and expenses spent on patrol vehicles. Recognizing the needs necessary for safety should be the vested interest of all law enforcement agencies.

Limitations that might have hindered this study may have resulted for several reasons. It is commonly acknowledged that law enforcement officers' responsibilities require them to sit for eight to ten hour shifts. It is also recognized that proper vehicle ergonomics should be a major factor in choosing the appropriate fleet vehicle that meets the needs of each agency and its officers. However, law enforcement agencies, large or small, might be failing to properly address or convey these concerns as a result of financial and/or time constraints. Also, some agencies lease vehicles, and altering or adding equipment could nullify warranties, which is another issue.

The study of police fleet vehicle and officer safety is relevant to contemporary law enforcement. It not only affects the officers but the community and those whom law enforcement agencies serve and protect on a daily basis. Safety, comfort, and convenience within the officer's vehicle directly impacts the degree of success with which he/she can serve, thereby offering benefits to the officer, the agency, and the taxpayer whom the officer serves.

REFERENCES

Alonso-Zaldivar, R. (2002, August 7). Police Officers Face New Hazard: Assault by Air Bag. *Los Angeles Times.* Retrieved from *http://articles.latimes.com/2002/aug/07/nation/na-copcars7*

Ferrante, J. (2002, December 2). Laptop Devices in Police Cars Spur Warning. *Tampa Tribune*, Metro Start, p.1.

Ford Motor Company. (2004). *Section 6: Reference Information. Air bag deployment interference. Police Interceptor Modifier Guide.* Retrieved from http://www.digitalallyinc.com/downloads/2004PoliceInterceptorModifierGuide.pdf

Kozlowski, J. (2008, April). *Space and self-management.* Officer.com. Retrieved from http://www.officer.com/print/Law-Enforcement-Technology/Space-and-self-management/1$41121

Michigan State Police 2009 Patrol Vehicle Tests. (2008, November-December). *Police Fleet Manager, 6(6),* 36-41.

Spencer, K. (2002, March 10). As laptops go into squad cars, warning flags go up over safety. *The Omaha World Herald.* Retrieved from http://nl.newsbank.com/nl-search/we/Archives?p_product=OWHB&p_theme=owhb&p_action=search&p_maxdocs=200&s_dispstring=spencer%20laptops%20squad%20AND%20date(1/1/1983%20to%201/24/2010)&p_field_date-0=YMD_date&p_params_date-0=date:B,E&p_text_date-0=1/1/1983%20to%201/24/2010)&p_field_advanced-0=&p_text_advanced-0=(spencer%20laptops%20squad)&xcal_numdocs=20&p_perpage=10&p_sort=YMD_date:D&xcal_useweights=no

Tucker, D. (2003, Fall). AOI air bag shut off switch. *Police Fleet Manager, 2(3),* 65-67.

Wikipedia. (n.d.). *Ergonomics*. Retrieved August 16, 2010 from

http://en.wikipedia.org/wiki/Ergonomics

APPENDIX A

Research Agency Selection Questionnaire

Research Agency Selection Criteria

Research Agency Name:	Comal County Sheriff's Office
Project Name:	Police Fleet Vehicle Equipment and Officer Safety Awareness
Project Manager:	Rick Cardenas
Project Sponsor:	LEMIT
Law Enforcement Agency:	
Facilitator:	
Review Date:	October 7, 2008

	Criteria	Yes/No		Comments
1	Does your agency lease your patrol fleet vehicles?	☐ Yes ☐ No		
2	Does Your agency have less than 25 patrol vehicles?	☐ Yes ☐ No		
3	Does your agency have more than 25 patrol vehicles but less than 50?	☐ Yes ☐ No		
4	Does your agency have more than 50 patrol vehicles but less than 100?	☐ Yes ☐ No		
5	Does your agency have more than 100 patrol vehicles? If so, how many.	☐ Yes ☐ No		

6	Does your agency assign vehicles to individual officers?	☐ Yes ☐ No		
7	Does your agency purchase your fleet vehicles completely outfitted for patrol?	☐ Yes ☐ No		
8	Does your agency purchase the police equipment and outsource the installations?	☐ Yes ☐ No		
9	Does your agency have more than one model patrol vehicle? If so please comment an approximate cost of each model.	☐ Yes ☐ No		
10	Does your agency have laptop computers (MDT/MDC)? Comment where they are mounted.	☐ Yes ☐ No		
11	Does your agency have rifle and shotgun mounts? If so comment where they are mounted.	☐ Yes ☐ No		
12	Does your agency partner two to a vehicle?	☐ Yes ☐ No		
13	Are your dash mount radar units properly mounted with the required mounting brackets? If not, comment.	☐ Yes ☐ No		
14	Does your agency allow passenger seat organizers, or weight objects to hold miscellaneous items for officer convenience?	☐ Yes ☐ No		
15	Are vehicle and equipment inspections done on regular basis? Please comment how often?	☐ Yes ☐ No		
16	Are your patrol cars equipped with a center console? If so, what model (ex. Jotto Desk, Havis, etc.)?	☐ Yes ☐ No		

17	Does your agency ever audit your officer's assigned equipment?	☐ Yes ☐ No		
18	Does your agency purchase trunk organizers?	☐ Yes ☐ No		
19	Does your agency allow take home cars? Comment if so, they can be taken out of your city or county.	☐ Yes ☐ No		
20	Does your agency have a fleet maintenance garage and mechanics that perform inspections and replacement or repairs on all police equipment? If so, how often?	☐ Yes ☐ No		

General Observations:
Comments:

APPENDIX B

MSP Ergonomic Evaluation	Ford Police Interceptor	Dodge Charger	Chevrolet Tahoe PPV	Chevrolet Impala 9C1	Dodge Magnum
Scores above are rounded. Final total scores include additional ratings not shown.					
Front bucket seat design	5.4	5.6	6.4	5.5	5.6
Front headroom	7.1	6.8	8	6.2	6.6
Front seat belts	6	6.4	7	6.4	6.5
Front ease of entry and exit	6.6	6.9	7.6	5.6	7
Overall front seat comfort	6.6	6.5	7.5	6	6.6
Rear seat leg room	6	6.2	7.2	3.4	6.1
Rear ease of entry and exit	5.8	5	6.4	3.5	5.9
Instrumentation clarity	5.9	6	7	6.8	6
Pedals, size and position	5.6	6.3	6.8	6.2	6.3
Steering wheel, size, tilt, & surface	7	5.7	7.5	6.7	5.7
Heat/AC location and adjustability	6.7	6.3	6.4	6	6.3
Forward visibility	7.2	6.4	7.4	7.3	6
Dashboard accessibility	8	8.4	6.8	7.5	8.4
Trunk accessibility	8.2	8	6.9	7.9	7.5
Engine compartment	8.7	8.8	8	8.3	8.8
Total scores	182.27	175.25	188.63	167.63	173.75

LASD Ergonomics Test Results	Chevrolet Impala	Chevrolet Tahoe	Dodge Magnum	Dodge Charger	Ford Crown Victoria Police Interceptor

The above does not represent entire report. When available, see the LASD Tests' Web site for full results. Author: Jonathan Kozlowski

APPENDIX C

Ford Motor Company
Section 6: Reference Information

Engineering Drawings

Air Bag Deployment Interference

⚠ WARNING: DO NOT PLACE OBJECTS OR MOUNT EQUIPMENT IN FRONT OF THE AIR BAG MODULE COVER OR IN FRONT SEAT AREAS THAT MAY COME IN CONTACT WITH A DEPLOYING AIR BAG. DASH, TUNNEL OR CONSOLE-MOUNTED EQUIPMENT SHOULD BE PLACED WITHIN THE SPECIFIED ZONE. FAILURE TO FOLLOW THESE INSTRUCTIONS MAY RESULT IN PERSONAL INJURY.

⚠ WARNING: DASH, TUNNEL OR CONSOLE-MOUNTED EQUIPMENT SHOULD NOT BE PLACED OUTSIDE OF THE SPECIFIED ZONE. FAILURE TO FOLLOW THESE INSTRUCTIONS MAY RESULT IN PERSONAL INJURY.

⚠ WARNING: DO NOT MOUNT EQUIPMENT BETWEEN THE SIDE OF THE FRONT SEAT TO THE DOOR TRIM THAT WOULD BLOCK DEPLOYMENT OF THE SIDE AIR BAG. FAILURE TO FOLLOW THESE INSTRUCTIONS MAY RESULT IN PERSONAL INJURY.

Driver/passenger air bags affect the way police equipment can be mounted in police vehicles. Any surfaces that could come into contact with an air bag during deployment, must not damage the air bag or alter its deployment path. Sharp edges, corners or protrusions could damage the nylon air bag material and reduce the effectiveness of the air bag. Do not mount or place any objects in the deployment path of an air bag. Air bags must be allowed to fully deploy without restriction. The deployment of air bags is not compatible with any configuration of police equipment mounting that places objects in the air bag deployment path. Equipment mounted or placed in the deployment area of an air bag will reduce the effectiveness of the air bag, damage the air bag, and potentially damage or dislodge the equipment.

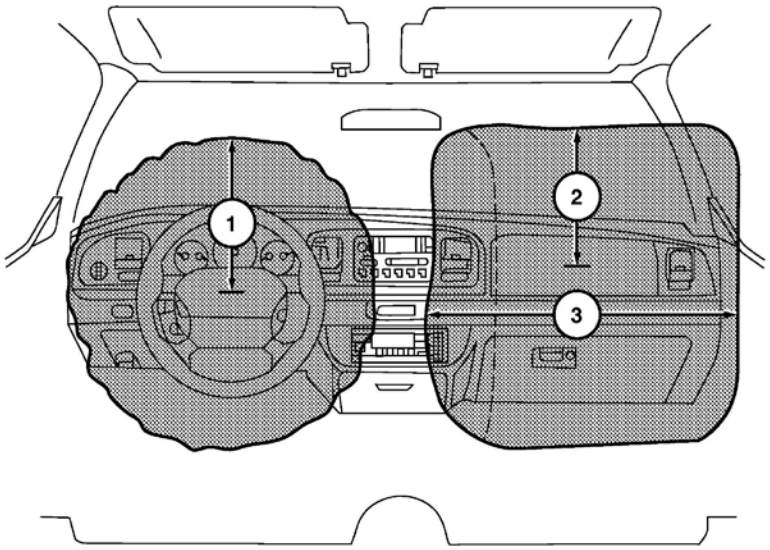
Some approximate dimensions for air bags, at full inflation, are provided in Figures 1 through 5. These dimensions are somewhat flexible and represent free form deployments without the

loading of occupants. The shaded areas in Figures 6 through 8 represent available police equipment mounting zones. These zones are shown for police vehicles equipped with standard bucket seats. While bench seats are optional and still appropriate for vehicles with certain limited police equipment requirements, the standard bucket seats are recommended for vehicles that require maximum available space for police equipment mounting. The zone dimensions provided in Figures 6 through 8 are approximate and will vary with the loading of occupants in the seats.

All air bag and equipment mounting zone dimensions are approximate due to different air bag deployment characteristics.

Mount no equipment between the side of the front seat and the door trim that would block deployment of the side air bag.

Section 6: Reference Information



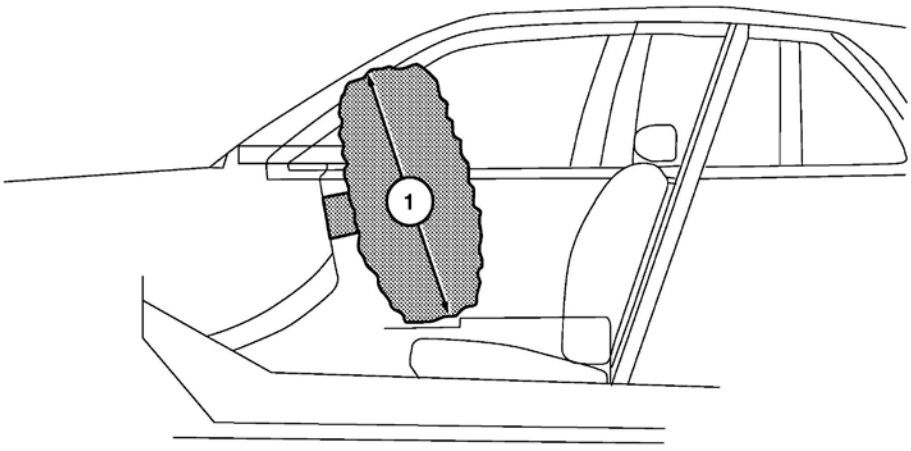
A0074658

Figure 1.

(1) 240 mm (9.5 inches) from center of air bag door

(2) 375 mm (15 inches) from center of air bag door

(3) 750 mm (29.5 inches)

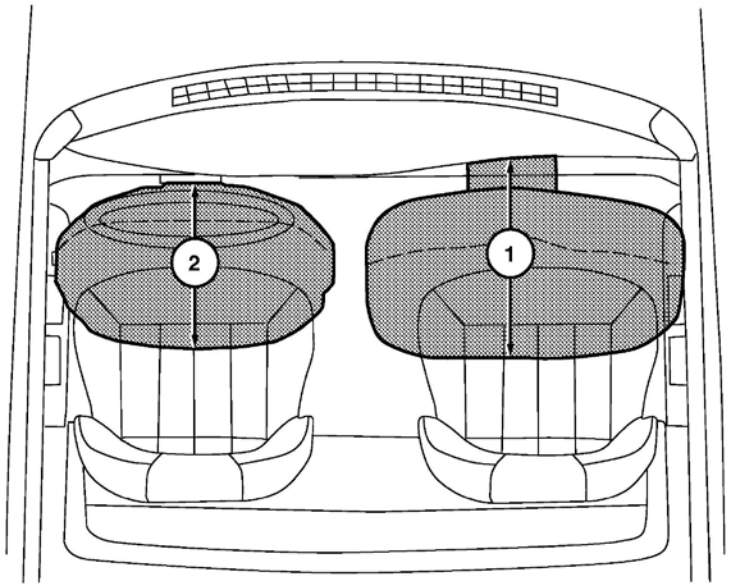


A0080796

Figure 2.

(1) 660 mm (26 inches) (passenger side shown)

Section 6: Reference Information



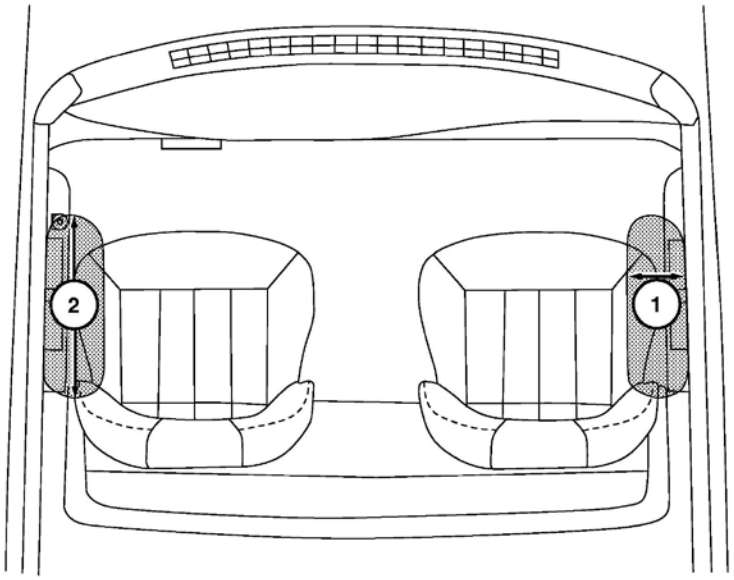
A0074660

Figure 3.

No objects should be placed between the air bags due to air bag variability.

(1) 580 mm (23 inches) front passenger

(2) 430 mm (17 inches) front driver



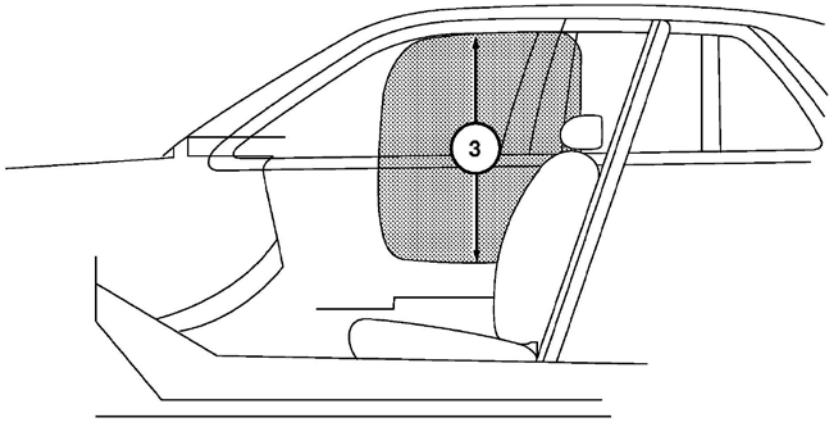
A0078523

Figure 4.

Section 6: Reference Information

(1) 200 mm (8 inches) from outboard side of seat

(2) 380 mm (15 inches) forward of seat back



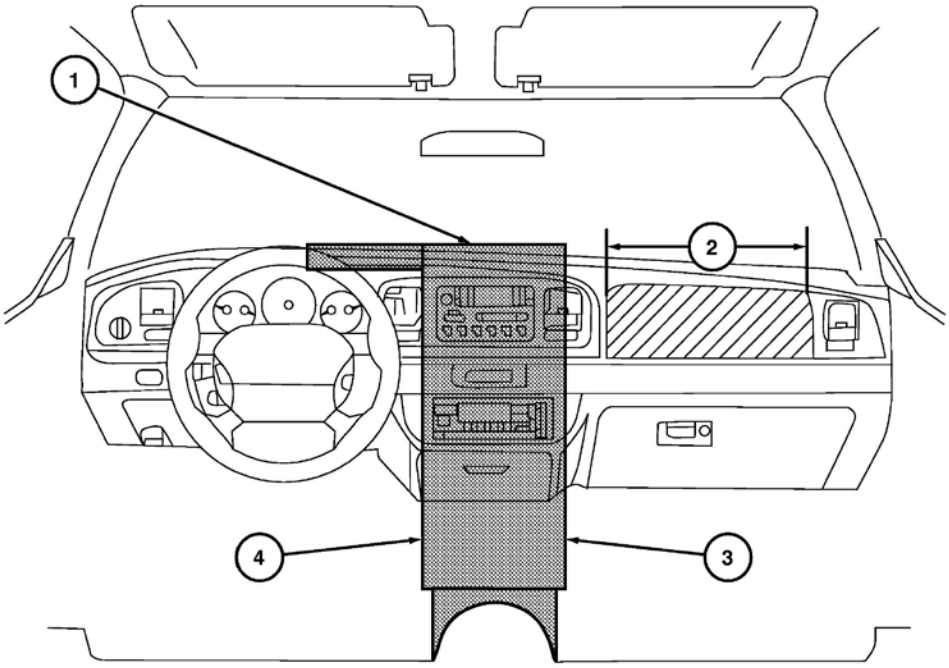
A0078524

Figure 5.

(3) 700 mm (27.5 inches) up from side air bag module

Section 6: Reference Information

Note: Figures 6 through 8 represent available police equipment mounting zones.



A0074662

Figure 6.

(1) Area on top of instrument panel. **Equipment must not interfere with driver visibility.**

(2) The air bag door must be kept clear for deployment of air bag.

(3) Area in front of center console from bottom of ashtray to top of instrument panel.

(4) 279 mm (11 inches) width horizontally centered on ashtray door.

Section 6: Reference Information

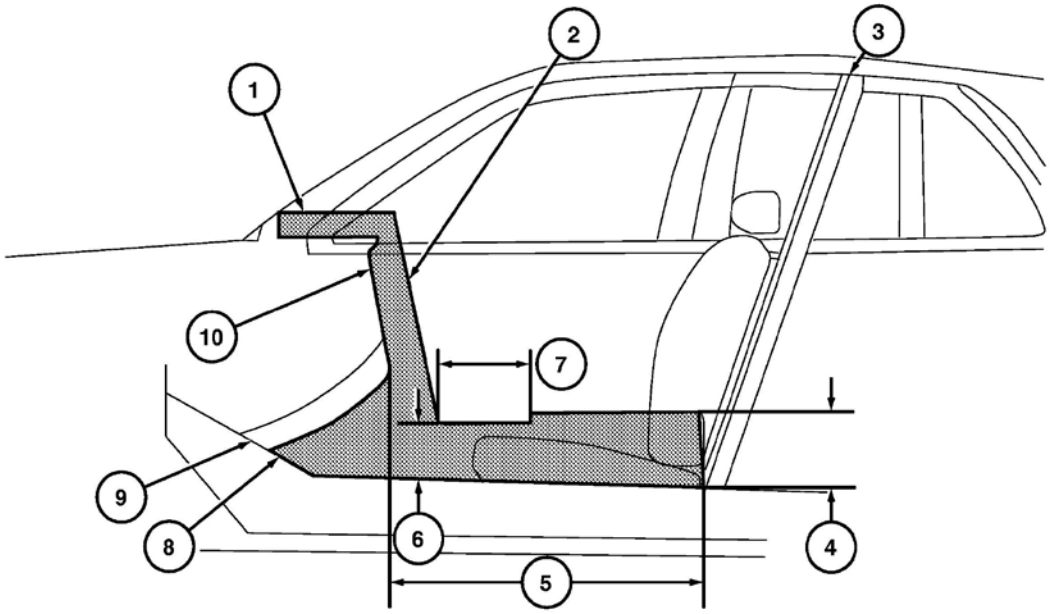


Figure 7.

(1) Area on top of instrument panel

(2) Area in front of center console from tunnel up to instrument panel

(3) Prisoner screen (reference only)

(4) 254 mm (10 inches)

(5) Area on tunnel between seats

(6) Height: 216 mm (8.5 inches)

(7) 305 mm (12 inches)

(8) Area on tunnel beneath center console

(9) Tunnel

(10) Depth: 38 mm (1.5 inches)